Walnutdale Farms-Satellite Heifer Facilities
Comprehensive Nutrient Management Plan

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Comprehensive Nutrient Management Plan
For
Walnutdale Farms / Satellite Heifer Facilities

Overview

Walnutdale Farms satellite heifer raising facilities are located in Wayland, Michigan. These entities are small, existing facilities that are part of an incorporated family run farm owned by [redacted]. 4230-14th Street is known as "[redacted]" and is home to an average 100 (150lb.) calves as well as 150 (250lb.) heifers. Also, at [redacted] there are 2 horses that are kept as pets. They are not included in the CNMP since the manure produced is handled separately. The "[redacted]" facility located at 4487-14th Street houses an average 80 (400lb.) heifers. The facility located at 4427-14th Street known as "[redacted]" holds an average 50 (600lb.) heifers. The remaining 100 (1,400lb.) dry cows are housed at "[redacted], which is located at 1284-144th Street. Ocassionally there are bulls housed at [redacted], which are included in cow numbers for that location.

Walnutdale Farms satellite locations have separate land bases to accommodate the nutrients produced. 174 acres are utilized for crop production and manure application. Of these 174 acres, approximately 80 are available for winter spreading.

Water quality concerns for Walnutdale Farms include: feedlot run-off from [redacted], [redacted] and [redacted]. Filter strips will be installed or maintained at [redacted] and [redacted] to correct these concerns. At [redacted], some form of containment will be built or the cattle will be moved to a different facility. The land application of manure is a potential source of contamination of surface waters as well. The surface waters in this area feed to tributaries of the Rabbit River. Proper management by Walnutdale using this plan and proper training of employees will minimize the risk of discharge.

Currently, Walnutdale Farms has no further expansion plans for these satellite locations. In fact, these facilities may be phased out within 5 years because they are on options and may not be used by Walnutdale when the time period is up.

Any change in livestock numbers of more than 10% and/or a change in land needs will require the plan to be updated as these changes take place.

Animal Outputs

Production
This plan is designed to manage nutrients produced at [redacted] and [redacted] satellite locations.

Table 1

Using MWPS-18 Section 1 Table 6, the estimated annual production is described below.

Animal Group /Number		Estimated Annual Manure Production Calculations				
		MANURE:		Bedding	Annual	
Calves @ [redacted]		per cow per day	days	/day/cow	Production	
# of cows:	100			0.27	4,928	Bedding cu.ft.
weight (lb):	150	0.2	365	Straw (cu.ft.)	7,300	Manure cu.ft.
Calves @ [redacted]		per cow per day	days			
# of cows:	150			0.46	12,593	Bedding cu.ft.
weight (lb):	250	0.32	365	Straw (cu.ft.)	17,520	Manure cu.ft.
Heifers @ [redacted]		per cow per day	days			
# of cows:	80			0.74	10,804	Bedding cu.ft.
weight (lb):	400	0.51	365	Sand (cu.ft.)	14,892	Manure cu.ft.
Heifers @ [redacted]		per cow per day	days			
# of cows:	50			1.11	10,129	Bedding cu.ft.
weight (lb):	600	0.8	365	Straw (cu.ft.)	14,600	Manure cu.ft.
Dry Cows @ [redacted]		per cow per day	days			
# of cows:	100			0.23	4,198	Bedding cu.ft.
weight (lb):	1400	1.82	365	Sand (cu.ft.)	66,430	Manure cu.ft.
		Total Solid Manure			**120,742**	**cu.ft.**
		Total Solid Manure with Bedding			**163,392**	**cu.ft.**
		Total Solid Manure with Bedding			**118,952**	**bushels**

* All bedding volumes based on information from the farmer

Table 2

Using MWPS-18 Section 1 Table 6, the estimated annual production is described below.

Animal Type/Number/Size		Estimated Annual Nutrient Production Calculations		
		lbs. per cow per day		
		N	**P**	**K**
Calves				
# of cows:	100			
Average weight:	150	0.05	0.01	0.04
Calves				
# of cows:	150			
Average weight:	250	0.08	0.02	0.07
Heifers				
# of cows:	80			
Average weight:	400	0.12	0.03	0.11
Heifers				
# of cows:	50			
Average weight:	600	0.18	0.05	0.17
Dry Cows				
# of cows:	100			
Average weight:	1,400	0.5	0.2	0.4
TOTAL LBS./YEAR		**31,244**	**10,549**	**26,207**

All barns included in this CNMP, with one exception for the 150lb. calves, have open feed lots. At [redacted] and [redacted] Walnutdale Farms uses a weekly scrape and haul method to remove the manure produced. At [redacted] the calf barn is cleaned monthly, while the heifer barn with a small, open feedlot is cleaned 2 times per month.

Manure applicators are trained to operate the equipment and are trained to know where they can and cannot spread manure. Fields maps included in this CNMP show sensitive areas with different colors signifying varying levels of sensitivity.

Feed: All feed for the satellite locations is stored at the main dairy.

Feed Refusal: Feed refusal is estimated at a 2-3% rate. All spilled or refused feed is collected and spread with dry manure at agronomically acceptable rates.

Veterinary Wastes: Needles and other veterinary wastes are stored in a "sharps" container (designated, hard, plastic container) and hauled to a landfill by a licensed waste hauler.

Animal Mortality: Animal mortalities are picked up by a local rendering firm known as MYPAC.

Feedlot Run-off:

[redacted] - Run-off at this location travels to the Southwest corner of the feedlot. The run-off leaves the barnyard, since there are no roof gutters or any other run-off diversions in place. If Walnutdale chooses to continue housing cattle at this facility, they will install a concrete wall or barrier to prevent run-off from leaving the feed lot by December 2008. If this facility will be used to house cattle a small receiving pit may be constructed, until a final decision is made a dirt berm or round bales will be used to contain the manure runoff from the feedlot.

[redacted] - Run-off from this barnyard collects in the Southwest corner, and is dispersed through a vegetated filter strip. This filter strip will be maintained, so that all nutrients are depleted as the run-off passes through it.

[redacted] - Run-off from the barnyard travels to the Northeast corner and is eroding the pasture that is in place. Also, there is an old push off ramp on the Southeast side of the feed lot that needs to be closed off. A filter strip will be established in the Southwest corner of the pasture to prevent further erosion and to deplete any excess nutrients from the feed lot run-off. This will be completed by December 2006. The old push off will be sealed off by December 2007.

[redacted] - Run-off at this particular location travels Northwest from the feed lot. This run-off is directed to a filter strip between the barns (see site map) where the nutrients are depleted as run-off passes through.

Collection

Manure Collection: At [redacted] and [redacted] Walnutdale Farms uses a weekly scrape and haul method for the outside feed lots. All manure and bedding in barns remain

in pen pack and are cleaned out on a monthly basis. At [redacted] the calf barns are cleaned monthly, while the heifer barn with a small, open feedlot is cleaned 2 times per month. All barns are scraped with a Bobcat.

Manure Transfer: Dry manure is loaded directly onto a 313 bushel Knight V-bottom spreader. All wastes are surface applied at agronomically acceptable rates and incorporated within 48 hours when conditions allow.

Manure Storage:

[redacted] The west end of the calf barn at [redacted] is used for a temporary storage area for dry manure produced in the barn. This area is 12' x 36' and can be stacked 6' high. Using these dimensions the storage time for this structure is approximately 86 days. The south west corner of the storage needs to have some of the boards replaced to prevent manure from spilling out of it.

[redacted] An old feed bunker is used only when manure cannot be applied to fields during the winter. This structure is rarely used and typically contains manure that is a straw pack that stacks easier. The walls are concrete and it has a dirt floor. This structure is not used to store manure from the cows housed at this operation.

Currently, there are no outside manure storage areas at any of the other satellite facilities. All barns are on a scrape and haul method to dispose of wastes. However, when winter conditions do not allow for spreading, dry manure will be stockpiled in fields away from any surface water or tile risers/outlets. Dirt berms will be created around all manure stockpiles to ensure nutrients do not leave the site. Manure will remain stockpiled until conditions become favorable for spreading. Where upon, it will be spread at agronomically acceptable rates and incorporated within 48 hours.

Conservation Practices on Fields Used for Manure Application

Soil Related: Included in this plan are soil test results as well as RUSLE (Revised Universal Soil Loss Equation) and MARI (Manure Application Risk Index) calculations for the fields designated for manure application. According to RUSLE, erosion is at or below tolerable levels on all fields. Field maps show sensitive areas by different colors signifying varying levels of sensitivity.

Wind Erosion: All fields in this plan have "I" values under 86. These fields have low susceptibility to wind erosion; therefore, no erosion worksheets are included in this plan.

Winter Spreading: Winter spreading is confined to approximately 80 acres and consists of scraping and hauling from all barns weekly to monthly when conditions allow. During the winter, if conditions are such that manure cannot be spread, it will be stockpiled in fields and spread as soon as conditions allow. Dry manure is only spread on fields with slopes of 6% or less. See Table 2 below. The fields identified below are not all low MARI values, these fields were examined and determined to have areas where winter spreading would be acceptable. Approximately 60 acres are needed for winter spreading, while 80 are available. This ensures Walnutdale will have enough acres provided to sustain winter spreading. These areas are identified on the field maps in appendix 2 by gray highlights.

Table 3

Fields Available for Winter Spreading

Field ID	Acres
H-1	20
Sab-10	20
Sab-11	20
Sab-12a	20

These fields and acres are designated on the field maps in appendix 2 by gray fill on the map.

Water Quality Related: Sensitive areas for spreading are noted on color coded maps and are included in this CNMP. Manure logs and copies of all maps will be kept in all tractors. Sensitive areas include waterways, open tile risers/outlets, and areas of unacceptable slope, wells, and distances to residences.

Land Application Management

Manure: All manure will be surface applied on available land with phosphorous levels less than 300. The MMP (Manure Management Planner) includes a spreading plan for manure application (appendix 5). Manure analyses are also included in this plan (appendix 3) for every barn.

Nutrient Budget: Crop nutrient removal is an essential part of production. Table 3 below indicates that the nutrients produced are less than the nutrients taken up by this particular cropping plan. The annual amount of P_2O_5 produced is 10,549 pounds (based on book values), and the annual pounds of P_2O_5 taken up by this rotation are 11,182. This shows that Walnutdale Farms has enough land available for nutrient utilization, and also that additional fertilizer will be needed for their cropping plan. Referring to the table below, 11,182 pounds of P_2O_5 are removed from a total of 174 acres. This equates to an average 64 pounds of crop removal for the entire farm. At that rate, the 174 acres available would be sufficient, but very close. However, according to current manure analyses, Walnutdale has more than a sufficient amount of acres available for nutrient utilization.

Table 4

Crop Nutrient Removal Uptake:

Crop	2007 Acres	Yield Goal Per Acre (tons/bushel)	Estimated Crop Nutrient Removal (using GAAMPs values below)		
			Total N (lb)	P205 (lb)	K20 (lb)
Corn-silage (tons)	157	20	29,516	10,362	25,120
Corn-grain (bu)	0	150	0	0	0
Alfalfa (tons)	0	7	0	0	0
Wheat-grain (bu)	17	70	1,428	750	440
Wheat-straw (tons)*	17	1.25	276	70	489
Soybeans (bu)	0	50	0	0	0
Total			**31,220**	**11,182**	**26,049**

*Wheat numbers are used twice since it is harvested for grain and straw.

Lbs. of Nutrient removed per unit: (Manure Management GAAMPs, 2004. pg 30)

Crop	Unit	Avail-N	P_2O_5	K_2O
Corn-silage	tons	9.4	3.3	8
Corn-grain	bu	0.9	0.37	0.27
Alfalfa	tons	45	13	45
Wheat-grain	bu	1.2	0.63	0.37
Wheat-straw	tons	13	3.3	23
Soybeans	bu	3.8	0.8	1.4

Manure tests included in this CNMP are reported in lbs/ton, and the dry spreader used is in bushels. The conversions used to convert the reported lbs/ton to lbs/bushel are included in appendix 8. Manure tests are composite samples that were sent to a laboratory for analysis.

Manure will be applied to fields according to current soil and manure tests (appendix 3). Manure tests will be taken annually. Manure is applied to fields based on 20 ton corn silage and 70 bushel wheat yields with 1.25 ton straw yields. These yield goals are achievable based on previous records and averages from Walnutdale Farms.

Soil Fertility: All soil samples were taken in composite samples of 25 acres or less at a depth of 10-12". Soil tests will be taken every three years to monitor nutrient levels.

Nitrogen Leaching: As stated previously, sensitive areas for manure application are noted on maps included in this plan (appendix 2). Maps are made available to anyone operating manure spreading equipment. Manure operators are trained to identify sensitive areas on field maps, and spread accordingly. Nitrogen leaching risk indexes from the soil types show that all 174 acres are in the medium risk category for leaching. To prevent leaching from occurring, manure will be spread at reasonable rates, such that nitrogen is never over applied for upcoming crops, and only when the forecast does not call for significant precipitation. These precautionary measures will prevent the offsite flow of nutrients by way of leaching. Further actions to prevent offsite flow include dry manure being surface applied away from all sensitive areas and incorporated within 48 hours (weather permitting).

Phosphorous Loading: Soils that are either naturally high in phosphorous or have had heavy phosphorous loadings may not have the capacity to attach additional phosphorous. Applying phosphorous to such soils may result in unattached phosphorous in soil water. This soluble phosphorous is very mobile, much like nitrate, and measures for control will be taken into account. On Walnutdale Farms, phosphorous will only be applied at crop removal rates for one year on all fields ensuring long term sustainability. By following the spreading plan, Walnutdale will avoid any phosphorous build up problems.

Odor Control: Odor control is reached and maintained at the four satellite locations. Walnutdale accomplishes this by not spreading on weekends, incorporating within 48 hours when the weather permits, not keeping the manure too wet, and only spreading when wind directions toward residences are less than 10 mph.

Record of CNMP Implementation

Records will be kept by (b) (6) [redacted] at the main dairy, which is located at 4309-14th St. Wayland, Michigan 49348. These records will be retained for 5 years and will include:

- Soil test reports
- Manure analysis
- Dates of manure application
- Source and rate of manure applied
- Dates and rates of other nutrients applied
- Dates of incorporation
- Method of application
- Acres and area of field application
- Weather conditions during and for the 24 hours after application of manure
- Field conditions during applications of manure
- Recommended nutrient application rates
- Previous crops grown and yields
- Plant tissue sampling and testing reports
- Pre-sidedress nitrate test reports

Inspections, Operations & Maintenance, Training

Included in this CNMP is a sample of a log sheet that Walnutdale uses for manure application. Operators log each load they haul, which source the manure is taken from, what spreader is used, field conditions and weather conditions, as well as the date and operator initials.

Inspections of all manure handling equipment will be done by the manure operator before transport. All employees will be trained upon hire in areas of manure spreading, equipment handling and operation, as well as equipment maintenance and calibration. Also, all new hires will be trained to spread according to highlighted field maps, avoiding sensitive areas.

Spreader Calibration: On 2/19/2004 the manure spreaders used at this facility were calibrated. This was done by weighing the spreaders full and empty and determining the capacity of the spreader and the area required to empty each spreader. Below are the calibrated rates and more detailed information can be found in appendix 8.

Knight 830 Side Slinger (dry): This manure spreader was determined to apply manure at a rate of 350 bushels/acre. This spreader also has the capacity to change the output by widening the door opening and increasing the rate the manure is pushed out of the spreader. A chart is included in appendix 8 that shows how tractor speed will affect application rates. Phosphorus application rates are also included for each manure source.

These two manure spreaders have the option of increasing or decreasing the rate that the manure is expelled from the spreader. This is helpful when manure types and nutrients

vary, but can also lead to inconsistencies in spreading. The most effective way to check the rate is to spread on a known area and count the loads it took to cover it, this method can be used as a check by Walnutdale farms.

At the calibrated rates for the hydro-push spreader, Walnutdale applies an excessive amount of phosphorous. One of a few options may be exercised. Walnutdale can continue to apply manure at the calibrated rate and not apply manure on those fields where the hydro-push spreader was used for 2 years. Another option would be to slow the rate that the manure is pushed out of the spreader, or speed up the tractor. A final option would be to discontinue use of this particular spreader.

Schedule of Implementation

This Comprehensive Nutrient Management Plan will be implemented by December of 2004, and updated annually based on manure tests, soil tests, and planned crop rotation.

A new filter strip will be established at Saben's in the Southwest corner of the current pasture by December 2006. The old push off will be sealed up as well by December 2007.

Run-off at Lucas' will be contained within the barnyard. This problem will be corrected by implementing a concrete wall or barrier. If this facility is not phased out, this will be completed by December 2008.

Emergency Action Plan

In the event of a spill, it is necessary to stop nutrients from entering surface or freshwater.

1. Attempt to dam or berm any spill from entering surface water. This can be done by using things such as round bales, sand, or other materials that would stop flow.
2. Call the MDEQ Pollution Alert System at 1-800-292-4706.
3. In the event that a County drain or creek is affected, call the Allegan County Drain Commissioner at 1-269-673-0440.
4. Once the spill is contained, action should be taken to collect and land apply the nutrients appropriately to prevent further run-off or leaching.
5. Record any uncontrolled discharge of wastewater that warranted emergency response to MDEQ Water Quality Division.
6. Leaking or malfunctioning equipment should be kept away from ditches, streams, and all channels of surface water. Equipment not operating as designed should be taken out of service immediately and repaired before using again.

Emergency Numbers

MDEQ Pollution Alert System	**1-800-292-4706**
MDEQ, Grand Rapids Office	**1-616-356-0500**

Allegan County Drain Commissioner	**1-269-673-0440**
Allegan County Environmental Health	**1-269-673-5411**

References:

- MWPS-18 Section 1 "Manure Characteristics"
- Fertilizer Recommendations for Field Crops in Michigan "Nutrient Removal by Several Michigan Field Crops"
- GAAMPS-Generally Accepted Agricultural Management Practices for Manure Management and Utilization, MDA July, 2003
- MSU Extension-Crop Advisory Team Alert "Winter Spreading: Keeping Manure Nutrients in the Field and Out of Surface Waters" October 3, 2003

Appendices:

- Appendix 1-site map
- Appendix 2-field maps
- Appendix 3-manure analysis & soil test results
- Appendix 4-crop history report & manure spreading plan
- Appendix 5-manure spreading log
- Appendix 6-RUSLE
- Appendix 7-MARI
- Appendix 8-calculations